

Operating Experience Weekly Summary 97-39

September 19 through September 25, 1997

Table of Contents

EVENTS	1
1. WASTE DRUM RUPTURES AT WASTE STORAGE FACILITY	1
2. SIX WORKERS AND FACILITY CONTAMINATED AT IDAHO	3
3. FAILURE TO FOLLOW WORK PERMIT CAUSES INSTRUMENT PANEL POWER LOSS.....	5
4. MODIFICATIONS MADE IN 1969 RESULTS IN UNREVIEWED SAFETY QUESTION	8



Visit Our Web Site

The Weekly Summary is available, with word search capability, via the Internet at http://tis.eh.doe.gov/web/oeaf/oe_weekly/oe_weekly.html. If you have difficulty accessing the Weekly Summary at this URL, please contact the ES&H Info Center, 1-800-473-4375 for assistance.

EVENTS

1. WASTE DRUM RUPTURES AT WASTE STORAGE FACILITY

On September 15, 1997, at the Paducah Gaseous Diffusion Plant, a 110-gallon over-pack drum containing a 55-gallon drum of nitric acid and a mixture of low-level radioactive waste ruptured in a waste storage facility. The force of the rupture expelled the inner drum and spread its contents over a 400-square-foot area. The low-level radioactive waste included technetium-99 and small quantities of transuranic materials. No personnel were inside the facility when the drum ruptured. Radiological control technicians monitored personnel who entered the contamination area in the morning before waste handlers discovered the incident and detected no contamination. Bioassay samples of workers who had entered the facility were negative. DOE assembled a Type B accident investigation team to review this event. Pressurized drums present several personnel hazards, including (1) injury from an expelled drum lid or fragments of the burst drum; (2) exposure to radioactive or hazardous contents of the drum; or (3) exposure to pyrophoric materials, which can ignite and burn. (ORPS Report ORO--LMES-PGDPENVRES-1997-0008)

All personnel evacuated the RCRA (Resource Conservation and Recovery Act of 1976) storage facility, and the facility manager restricted access to authorized personnel (fire department and HazMat response personnel). Emergency response personnel checked 15 other drums in the area that contained the same waste. These drums appeared to be intact, with no apparent bulging. Emergency and HazMat responders described brown liquid (the contents of the drum) sprayed over an area that included the floor, walls, and ceiling. They found one of the interior drums, which was over-packed, about 15 feet from the original storage location. The outermost 110-gallon drum remained in place in the original storage location. They also observed an apparent on-going reaction between the nitric acid and floor areas where the contents spilled. A plant HazMat team neutralized the acid spill area.

The drum that ruptured held a 55-gallon drum of waste generated in the 1960s. In the 1980s, waste handlers over-packed the 55-gallon drum in an 85-gallon steel drum. In 1994, waste handlers over-packed it again in a 110-gallon poly-lined steel drum. Waste handlers opened the drum for sampling in July 1997, and a RCRA inspection of the storage facility conducted on September 12 indicated normal conditions. However, the double over-pack made it difficult to observe signs of over-pressurization. Investigators believe nitric acid reacting with the steel drum produced the over-pressurization.

OEAF engineers also reviewed a pressurized drum event that occurred at another Paducah storage facility on September 16, 1997. In this event, the lid blew off a drum when a worker was attempting to open it for a monthly sample. The worker loosened the bolt for the lid-retaining ring, and the lid traveled 1 to 2 feet vertically and landed on top of the drum. The drum was one of three that contained sediment sludge generated on July 15, 1997. The sludge was contaminated with detectable levels of PCBs (polychlorinated biphenyls) and low-level radioactivity from an outfall ditch. There were no injuries, and no material left the drum. Investigators have not determined the cause of the pressurization, but other pressurized drum events have shown that decomposition of organic materials can produce the build-up of gases. (ORPS Report ORO--LMES-PGDPENVRES-1997-0009)

NFS has reported numerous pressurized drum events in the Weekly Summary. The following examples have occurred in the past 2 months.

- Weekly Summary 97-32 reported that two 55-gallon drums of phosphoric acid ruptured, spilling 100 gallons of acid onto the floor of a storage cell at the Pacific Northwest National Laboratory. Packaging personnel had repackaged the acid into metal drums earlier in the day. The drums over-pressurized because the mixing of phosphoric acid and metal (incompatible materials) resulted in the formation of hydrogen gas. (ORPS Report RL--PNNL-PNNLBOPER-1997-0022)
- Weekly Summary 97-30 reported that a sealed, plastic-lined, 55-gallon drum, containing organic waste materials from the cleanup of a nitric acid spill, over-pressurized and blew the lid off the drum at the Oak Ridge Y-12 Site. The force of the venting caused the lid to strike and bend a fire protection system pipe and dislodge the pipe hangers. The over-pressurization was the result of a chemical reaction from the mixing of incompatible materials (nitric acid and organics). (ORPS Report ORO--LMES-Y12WASTE-1997-0004)

These events underscore the dangers associated with stored waste material that can result in chemical reactions and pressurization of storage containers. These reactions can occur from the mixing of incompatible chemicals, the storage of materials in incompatible containers, or the decay and decomposition of organic materials. These two events at Paducah involved a drum of sludge that had been stored for only 2 months and a drum that had degraded during long-term storage, illustrating that chemical reactions can occur quickly or over long periods of time. Facility managers also need to ensure that procedures and methods for opening sealed drums and containers include precautions and guidance for preventing lids from being blown off.

Following the May 14, 1997, chemical explosion at the Hanford Plutonium Reclamation Plant (ORPS Report RL--PHMC-PFP-1997-0023 and Weekly Summary 97-21), the Office of Environment, Safety and Health issued DOE/EH-0554, Safety Alert 97-1, "Chemical Explosion at Hanford." This notice discusses long-term changes to chemicals stored in vessels or drums because of degradation or concentration. In June 1997, NFS issued DOE/EH-0557, Safety Notice 97-01, "Mixing and Storing Incompatible Chemicals," as a result of the Hanford event and a May 22, 1997, over-pressurization and rupture of a waste shipping container at Fernald (ORPS Report OH-FN-FDF-FEMP-1997-0034). The notice contains lessons learned related to the mixing and storing of incompatible chemicals. Copies of the Safety Alert can be obtained by calling 1-800-473-4375 or (301) 903-8358. Copies of Safety Notices can be obtained by contacting the ES&H Information Center, (301) 903-0449, or by writing the ES&H Information Center, U.S. Department of Energy, EH-72/Suite 100, CXXI/3, Germantown, MD 20874. Safety Notices are also available on the Operating Experience Analysis and Feedback Home Page at http://tis.eh.doe.gov:80/web/oeaf/lessons_learned/ons/ons.html.

The following additional DOE and industry documents provide valuable guidance for all personnel who work with chemicals and hazardous materials.

- The Office of Environment, Safety and Health provides information in DOE/EH-0296, "Mixing of Incompatible Chemicals," February 1993, about the hazards associated with mixing of incompatible chemicals.
- DOE/NS-0013, Safety Notice 93-1, "Fire, Explosion, and High-Pressure Hazards Associated with Waste Drums and Containers," discusses handling, storing, venting, and opening containers suspected of being pressurized or containing flammable vapors.
- DOE-HDBK-1100-96, *Chemical Process Hazards Analysis*, February 1996, and DOE-HDBK-1101-96, *Process Safety Management for Highly Hazardous Chemicals*, February 1996, provide guidance for DOE contractors managing facilities and processes covered by the Occupational Safety and Health Administration (OSHA) Rule for Process Safety Management of Highly Hazardous

Chemicals (29 CFR 1910.119). Both handbooks are available on the Department of Energy Technical Standards Home Page at URL <http://www.doe.gov/html/techstds/standard/standard.html>.

- DOE Defense Programs Safety Information Letter, SIL 93-04, *Lessons Learned from Radiochemical Tank Explosion at Tomsk Russia*, July 1996, provides corrective actions and recommendations concerning equipment, operations, and controls to prevent Tomsk-like accidents at DOE facilities.
- DOE Defense Programs Safety Information Letter, SIL 96-01, *Incidents from Chemical Reactions due to Lack of or Failure to Follow Proper Handling Procedures*, June 1996, provides guidance to prevent these incidents.
- DOE Defense Programs Safety Information Letter, SIL 96-02, *Adequacy of Process Vessel Venting Capacity*, July 1996, addresses vessel-venting problems like those associated with the Tomsk event.
- DOE Defense Programs Safety Information Letter, SIL 96-05, *Compatibility Considerations in the Mixing of Waste Chemicals*, November 1996, addresses these issues and provides a guide to available information.
- OSHA Regulation 29 CFR 1910.119, *Process Safety Management of Highly Hazardous Chemicals*, contains the requirements for preventing or minimizing the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals. OSHA Regulation 29 CFR 1910.119 is available on the OSHA Home Page at URL http://www.osha-slc.gov/OshStd_data.

KEYWORDS: pressurized drum, waste, chemical reaction, chemical spill

FUNCTIONAL AREAS: Materials Handling and Storage, Chemistry, Industrial Safety

2. SIX WORKERS AND FACILITY CONTAMINATED AT IDAHO

On September 17, 1997, at the Idaho National Engineering Environmental Laboratory, six workers performing maintenance on a remote-handling manipulator in the Hot Cell Facility were contaminated with europium. The facility was also contaminated. The facility manager immediately activated the Test Reactor Area Emergency Control Center, advised personnel to stand clear of the facility, and evacuated the facility. An Emergency Control Center response team performed area surveys and determined that the contamination had not spread outside of the facility. The following day, a re-entry team obtained surveys and swipes for decontamination planning. They measured approximately 260,000 dpm in the location with the highest level of contamination. Radiological and Environmental Sciences Laboratory personnel confirmed that two workers received uptakes of 10 to 30 mrem over 50 years committed effective dose equivalent. Contamination events can result in environmental and personnel hazards in addition to posing severe operational impacts. (ORPS Report ID--LITC-TRA-1997-0021)

The remote-handling manipulator, located inside a wall in the hot cell area, is known to be contaminated. The workers had extracted the manipulator from the wall and covered it with a plastic sleeve to control contamination. While they were removing the manipulator, a radiological control technician told them that the radiological levels had increased to 30 mrem/hr on contact with the manipulator. This exceeded the allowable limit in the permit. The workers re-inserted the manipulator to within 1 foot of the wall, cut and removed the sleeve, completed insertion of the manipulator, and exited the area. As they were exiting, the radiological control technician

measured excessive levels of contamination and the continuous air monitor alarmed. Respiratory protection was not required in the radiological work permit.

Investigators believe the workers released the contamination into the work area while cutting the sleeve. Facility personnel will decontaminate and clean-up the facility by October 15. The investigation to determine the exact cause of this event is on-going. Corrective actions will be determined when the investigation is completed.

NFS has reported personnel contamination events in several Weekly Summaries. Following are some examples.

- Weekly Summary 97-10 reported that a Lawrence Berkeley National Laboratory researcher spilled a small amount of orthophosphate P-32 while opening a vial. The spill resulted in skin, clothing, and internal contamination of the researcher and contamination to the clothing of two other people. The surrounding area and equipment were also contaminated. The work was being conducted in a laminar-flow biohood in a laboratory room. Neither the biohood nor the room was authorized for the radioisotope work. The activity of the radioisotope was ten times the authorized amount for the laboratory, and the chemical form was not authorized. (ORPS Report SAN--LBL-LSD-1997-0002)
- Weekly Summary 97-06 reported that a deactivation and decommissioning worker at Rocky Flats Environmental Technology Site received skin contamination while cutting a glovebox with a power-driven cutter in a soft-sided containment house. The worker had 2,000 dpm/100 cm² on his neck, 7,000 dpm on his chest area, and 7,000 dpm on the inside of his left upper arm. The radiological control technician also detected 7,000 dpm on the worker's respirator facepiece. The worker was successfully decontaminated. (ORPS Report RFO--KHLL-PUFAB-1997-0011)
- Weekly Summary 96-30 reported that at Oak Ridge National Laboratory, Y-12 Facility, an operations supervisor and four operators received uptakes of radioactive material. Investigators believe the operations supervisor and operators were exposed to airborne uranium while moving contaminated construction debris from a high contamination area to a radiological buffer area. Preliminary bioassay results indicated that they may have received doses ranging from a few mrem to as high as a 3 rem, 50-year committed effective dose equivalent. The operations supervisor and four operators, trained to radiation worker II level, did not recognize an environment where there was potential for airborne radiological contamination. (ORPS Report ORO--LMES-Y12NUCLEAR-1996-0014)

In this event facility personnel (including, job planners, workers, and radiological control technicians) may not have recognized an environment where there was a high potential for airborne radiological contamination. Facility personnel in charge of training should review the following documents to ensure that radiological worker training emphasizes the need for cautious attitudes and outlines the type of mistakes that can lead to contamination events.

- DOE/EH-0256T, *Radiological Control Manual*, states: "Each person involved in radiological work is expected to demonstrate responsibility and accountability through an informed, disciplined, and cautious attitude toward radiation and radioactivity." The manual sets forth DOE guidance on the proper course of action in the area of radiological control. Site managers and employees should ensure they understand and can apply radiological control program requirements in the workplace to minimize radiation exposure.
- NFS issued DOE/EH-0420, Safety Notice 94-03, "Events Involving Undetected Spread of Contamination," in September 1994. The notice provides guidance, good

practices, and corrective actions to prevent the spread of contamination. This notice also contains information on common contributing causes, including (1) failure to follow applicable radiological protection procedures; (2) failure to adequately perform required surveys; (3) inadequate training for personnel involved in handling and use of radioactive material; (4) failure of radiation protection personnel to properly identify, analyze, and respond to the event; (5) failure to exercise appropriate precautions when handling radioactive material; (6) inadequate supervision or management oversight of activities involving handling and use of radioactive material; and (7) inadequate identification of existing contamination.

Safety Notice 94-03 can be obtained by contacting the ES&H Information Center, (301) 903-0449, or by writing to the ES&H Information Center, U.S. Department of Energy, EH-74, Suite 100, Century XXI, Third Floor, Germantown, MD 20874. Safety Notices are also available on the OEAF Home Page at http://tis.eh.doe.gov:80/web/oeaf/lessons_learned/ons/ons.html.

KEYWORDS: radiation, internal exposure, contamination

FUNCTIONAL AREAS: Radiological Protection, Maintenance

3. **FAILURE TO FOLLOW WORK PERMIT CAUSES INSTRUMENT PANEL POWER LOSS**

On September 18, 1997, at the Savannah River Site, subcontractor electricians caused a power loss to an instrument panel when they opened an electrical disconnect without authorization. The electricians had completed the installation of some heat tracing tape in accordance with a work permit and closed the breaker to energize it. No power was supplied, so they decided to troubleshoot the problem. The electricians believed that a motor control center electrical disconnect next to a heat trace selector switch provided power to the heat tracing panel. They opened the disconnect, verified that fuses were installed, and closed it. When they opened the disconnect, control room alarms activated, and an operator responded to investigate. He determined that the electricians had opened and operated the wrong disconnect, causing the power loss to a transfer-tank instrument panel. Investigators determined that the electrician's work permit did not allow for troubleshooting activities. Failure to follow procedures led to the unexpected loss of power to equipment. (ORPS Report SR--WSRC-HTANK-1997-0028)

The facility manager held a critique. Critique members determined that power to the panel was lost when the electricians opened the motor control center electrical disconnect, causing the alarms to activate. They also determined that the electrical disconnect was properly labeled and that the electricians failed to read the label before they opened it. Critique members determined that the event occurred because the electricians (1) performed work outside the boundaries of the authorized work control permit, (2) did not notify the appropriate personnel before starting work, (3) did not read the work control permit or understand the scope of work, (4) did not read the label on the electrical disconnect, and (5) operated permanent plant equipment without authorization.

The facility manager issued a safety citation to the subcontracting organization. This citation prohibited work restart until the subcontractor submits a corrective action plan to prevent recurrence.

NFS has reported on failure to follow electrical procedures in several Weekly Summaries. Following are some examples.

- Weekly Summary 97-20 reported that a Fernald Environmental Management Project subcontract electrician was exposed to a 480-volt electrical shock hazard

when he violated procedures. The facility manager determined that he connected wiring in a repaired conduit for parking lot lighting to a 480-volt source without authorization and outside his job scope. (ORPS Report OH-FN-FDF-FEMP-1997-0032)

- Weekly Summary 97-14 reported that decontamination and decommissioning workers at the Hanford N-Reactor cut through a conduit into an energized 220-volt cable. Markings on the conduit indicated the cable was de-energized and a zero energy check had been completed. When the workers cut the conduit and wire they observed arcing and sparking. Investigators determined that the workers bypassed hold-points required by the procedure and did not conduct a zero energy check. (ORPS Report RL--BHI-NREACTOR-1997-0006)
- Weekly Summary 97-03 reported that a Rocky Flats Environmental Technology Site building manager found several external electric circuit breaker operators (handles) that had been replaced without authorization or the required planning and coordination with other building activities. Replacement required a worker to open the panels, exposing him to energized wires. Investigators found no authorization to perform the work and determined that written procedures for the work were not available or used. (ORPS Report RFO--KHLL-NONPUOPS1-1997-0002)

This event illustrates the need for facility managers to ensure that contractors understand and follow work control and configuration management programs. In this event, the contractor performed work that was not delineated in the work permit. This is an indication that the contractor either did not understand or did not follow established facility work control programs. It also indicates that facility management failed to adequately communicate the importance of work control programs to the contractor. Facility managers are ultimately responsible for ensuring successful completion of work activities. Routine monitoring of contractor and subcontractor work by facility managers and supervisors will help ensure that maintenance activities are conducted in accordance with facility policy and procedures.

Facility personnel responsible for work that is performed by contractors should clearly understand their responsibilities. They should review the following Orders and standards to ensure adequate oversight and control of work activities that are performed by contractors.

- DOE O 4330.4B, *Maintenance Management Program*, chapter 15, "Management Involvement," identifies the degree of management involvement in oversight and approval of maintenance activities. Section 3.1.1 states that contracted maintenance services must be controlled and overseen to ensure that contracted work is performed to the same standard as established for the maintenance organization. Contract personnel must be qualified for the work they perform. Facility managers should ensure that when non-facility workers perform maintenance they are familiar with plant policies and procedures and qualified to do the work.
- DOE-STD-1051-93, *Guideline to Good Practices for Maintenance Organization and Administration at DOE Nuclear Facilities*, section 2.3.8, "Non-Facility Personnel," states that when non-facility personnel are used, the duties, authorities, responsibilities, and functional interfaces with personnel should be clearly defined. Section 4.3.4, "Management Control of Plant Configuration," provides guidance to ensure plant configuration is maintained and that it conforms to established design bases.
- DOE-STD-1053-93, *Guideline to Good Practices for Control of Maintenance Activities at DOE Nuclear Facilities*, section 3.4.6, "Control of Non-facility Contractor and Subcontractor Personnel," states that contractor and subcontractor personnel

should perform maintenance under the same controls and standards as facility maintenance personnel. It further states that facility supervisors should review the work of contractors and subcontractors (1) during preparation for work, (2) at the job site, (3) during post-maintenance testing and acceptance inspections, and (4) when needed to enforce requirements.

- DOE/EH-0502, Safety Notice 95-02, "Independent Verification and Self-Checking," describes a technique that requires workers to (1) stop before performing the task to eliminate distractions and identify the correct component; (2) think about the task, expected response, and actions required if that response does not occur; (3) reconfirm the correct component and perform the function; and (4) review by comparing the actual versus the expected response. Human actions can be considered a barrier to provide controls over hazards associated with a job.

KEYWORDS: work package, procedures, subcontractor

FUNCTIONAL AREAS: Work Control, Electrical Maintenance

4. MODIFICATIONS MADE IN 1969 RESULTS IN UNREVIEWED SAFETY QUESTION

On September 16, 1997, at a Hanford reprocessing facility, the Facility Plant Review Committee reported an unreviewed safety question because ventilation system modifications made in 1969 were not in accordance with the safety analysis report. The modifications included adding charcoal filters and replacing exhaust fans. Contract engineers recently prepared a draft fire hazard analysis using an assumption that the High Efficiency Particulate Air (HEPA) filters would fail during a localized fire. Facility engineers questioned this assumption, reviewed operating limits for the filters and exhaust fans, and presented an unreviewed safety question evaluation to the committee. The committee agreed that the modifications would result in the collapse of the filters during a design basis fire leading to an unfiltered radioactive release through the main stack. The failure of the filters did not match the accidents in the safety analysis report. The facility ventilation system is contaminated with plutonium. The facility manager placed the facility in a safe condition and suspended all in-cell work requiring hot work permits. Previous reviews of the safety analysis report failed to identify this discrepancy. (ORPS Reports RL--PHMC-324FAC-1997-0010 and RL--PHMC-324FAC-1997-0014)

Investigators determined that workers modified the ventilation system in 1969 by installing charcoal filters downstream of the HEPA filters and installing higher capacity exhaust fans. They replaced the fans to compensate for an increased differential pressure caused by the addition of the charcoal filters. However, no one analyzed the impact of these modifications on the HEPA filters. While preparing the fire hazard analysis, contract engineers noticed that the building safety analysis report assumes the HEPA filters load with smoke and become plugged during a localized in-cell fire. They concluded that the smoke-loaded filters would fail because of the increased differential pressure. Facility engineers did not believe this was a credible scenario until they reviewed the fan's operating capabilities and the limitations on the HEPA filters. They also concluded that the 1969 modifications provided the mechanism for the filters to fail.

The facility manager directed maintenance personnel to modify the operation of the fans to prevent conditions that could lead to a filter failure. Mechanics installed new pulleys on the fans and motors to reduce the fan speed. Facility engineers will verify the new operating conditions to ensure that the filters cannot fail and that the facility remains within the conditions presented in the

safety analysis report. The facility manager also indicated that specific forms of hot work (e.g., automated gas tungsten arc welding) may be authorized before the modification is completed if there is adequate, documented justification. Facility engineers are also evaluating another fire scenario. This scenario assumes that a hot cell window breaks, causing a larger fire. OEAF engineers will continue to follow this event and will provide additional information when facility managers complete their investigation.

NFS has reported unreviewed safety questions and potential unreviewed safety questions in several Weekly Summaries. Following are some examples.

- Weekly Summary 97-34 reported that Kaiser-Hill Company notified the DOE Rocky Flats Field Office of a potential unreviewed safety question regarding the structural strength of HEPA filters. Kaiser-Hill engineers evaluated dust-loading and wetting on the filters by the fire deluge system and determined that the structural strength of the filter media would not meet the intended function. They also determined that the filter media is significantly weaker where it folds around aluminum separators. (ORPS Report RFO--KHLL-SITEWIDE-1997-0001)
- Weekly Summary 97-23 reported that Hanford K-Basins West facility managers declared an unreviewed safety question discovery because a temporary pump and flexible hose could siphon water out of the basin after a postulated design basis earthquake. A subsequent engineering analysis revealed that K-Basins had been in this condition for approximately 2 years. (ORPS Report RL--PHMC-KBASINS-1997-0008)
- Weekly Summary 97-08 reported that a fire protection engineer at Oak Ridge discovered a paddle-type flow switch installed in a pre-action fire protection system contrary to National Fire Protection Association standards. Previous walk-downs of fire systems to designate them as limited condition of operability systems failed to identify this discrepancy. The as-found condition of the paddle-type flow switch resulted in an unreviewed safety question. (Lessons Learned L-1997-OR-LMESY12-0201 and ORPS Report ORO--LMES-Y12NUCLEAR-1996-0012)

OEAF engineers searched the ORPS database for reports where safety analysis report discrepancies resulted in safety status degradations and found 98 occurrences. Figure 4-1 shows the distribution of root causes reported by facility managers for these events. Management problems represented 65 percent of the root causes. As shown in the figure, policy not adequately defined, disseminated, or enforced accounted for 35 percent of the management problems, with an additional 30 percent attributed to inadequate administrative control.

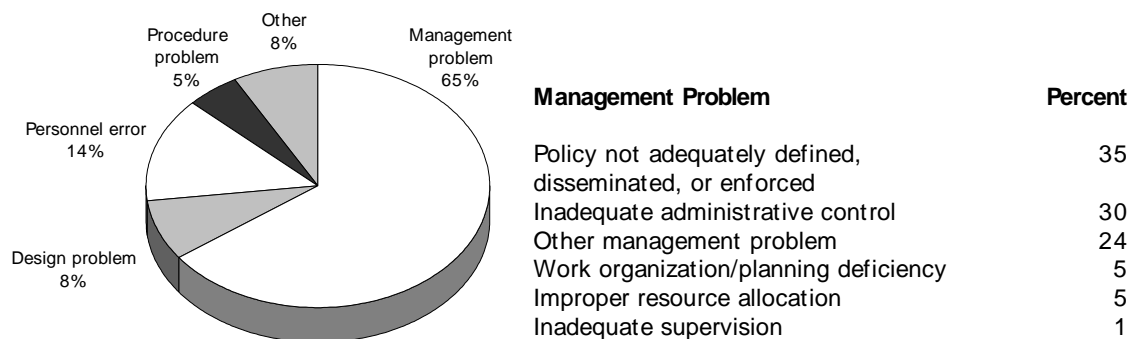


Figure 4-1. Distribution of Root Causes for Safety Analysis Report Discrepancies Resulting in Safety Status Degradation¹

This event illustrates the importance of evaluating all aspects of design modifications. In this event, a design basis fire could have resulted in a radioactive release that seriously compromised the health and safety of workers and the public. In addition, required annual reviews of the safety analysis report should have identified the discrepancy before 28 years had elapsed.

Facility managers and supervisors should consider implementing configuration management programs to ensure that the facility authorization basis adequately reflects the design basis. Given the age of some facilities, historical information may be difficult, if not impossible, to obtain. A configuration management program would provide personnel responsible for design changes with complete information needed to adequately determine if proposed designs affect the authorization basis. Facility personnel responsible for completing or approving unreviewed safety question determinations or design changes should review the following Orders and standards to ensure they understand how the authorization bases relate to design bases and what should be incorporated in a complete safety evaluation.

- DOE O 5480.21, *Unreviewed Safety Questions*, establishes program requirements that allow contractors to make changes to plant and procedures without prior DOE approval. The Order states that the following three criteria are used to identify unreviewed safety questions when changes are made to the facility: (1) if the probability of occurrence or the consequences of an accident that is analyzed in the safety analysis report are changed; (2) if the possibility of an accident of a different type than analyzed in the report may be created; and (3) if the margin of safety, as defined in any technical specification, is reduced.
- DOE O 5480.23, *Nuclear Safety Analysis Reports*, states that it is DOE policy that nuclear facilities and operations be analyzed to (1) identify all hazards and potential accidents associated with the facility and the process systems, components, equipment, or structures; and (2) establish design and operational means to mitigate these hazards and potential accidents. The results of these analyses are to be documented in safety analysis reports. This Order also required periodic review and updates of safety analysis reports to ensure that information is current and remains applicable.
- DOE-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*, provides a graded approach to the preparation of safety analysis reports for nuclear facilities. The standard discusses the facility's stage in its life cycle and states that all safety analysis reports should furnish information about subsequent stages of the facility life cycle, including end-of-life decontamination and decommissioning.
- DOE-STD-1073-93, *Guide for Operational Configuration Management Program*, provides program criteria and implementation guidance for establishing consistency among design requirements, physical configuration, facility documentation and for maintaining this consistency. This standard states that an effective configuration management program will increase the availability and retrievability of accurate information to support safe, sound, and timely decision-making related to facility design and operations.

¹ OEAF engineers searched the ORPS database using the graphical users interface for reports with nature of occurrence code "01C" (safety status degradation) AND narrative containing "safety analysis report" AND (discrepanc@ OR error@ OR deficienc@) and found 98 reports. Based on a random sampling of 20 events, OEAF engineers determined that each slice is accurate within ± 1 percent.

KEYWORDS: unreviewed safety question, safety analysis report, ventilation system, modifications

FUNCTIONAL AREAS: Licensing/Compliance, Configuration Control, Modifications